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(54) **EXPANDABLE WELLBORE JUNCTION**

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(52) U.S. Cl. **166/298; 166/55.1; 166/117.6; 166/313; 166/376; 175/81**

(58) Field of Search **166/50, 55.1, 117.5, 166/117.6, 298, 313, 376; 175/79, 80, 81, 82**

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,331,293 * 10/1943 Ballard 166/117.5
2,397,070 3/1946 Zublin .
4,444,276 4/1984 Peterson, Jr. .
5,318,122 6/1994 Murray et al. 166/313
5,330,007 7/1994 Collins et al. 166/313
5,348,095 9/1994 Worrall et al. .

5,388,648 2/1995 Jordan, Jr. 166/380
5,425,559 6/1995 Nobileau .
5,655,602 8/1997 Collins et al. 166/313
5,695,008 12/1997 Bertet et al. 166/187
5,718,288 2/1998 Bertet et al. 166/287
5,771,972 * 6/1998 Dewey et al. 166/298
5,794,702 8/1998 Nobileau .
5,813,465 * 9/1998 Terrel et al. 166/50 X
5,937,955 * 8/1999 Nims et al. 166/50 X
6,059,037 * 5/2000 Longbottom et al. 166/50 X

FOREIGN PATENT DOCUMENTS

0136935 4/1985 (EP) .
0795679A2 2/1997 (EP) .
WO96/23953 8/1996 (WO) .
9706345 2/1997 (WO) .
WO99/13195 3/1999 (WO) .

OTHER PUBLICATIONS

Drilling Engineering Association "Rapid Junction" Project Proposal Form, Undated 1998 DEA Rapid Junction Proposal, dated Jan. 15, 1998.

* cited by examiner

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(57) **ABSTRACT**

Multiple wellbores are interconnected utilizing a deflection device having a guide layer of lower hardness than the body of the deflection device, and a cutting tool having a guide portion and being operative to cut through the deflection device guide layer and a tubular structure lining a wellbore.

13 Claims, 22 Drawing Sheets

